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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,173	01/17/2002	Khoi A. Phan	F0632	3175

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/052,173

Applicant(s)

PHAN ET AL.

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 9-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 18-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 9-17 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Filed 3/13/05 ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steffan et al. (US 6,238,940) and Lee (US 6,052,183).

Steffan describes a conventional method of monitoring defects at the surface of the wafer comprising: providing a substrate that has numerous processing steps including oxidation, etching, metallization, and cleaning (claimed providing a substrate with at least one top layer) (col. 1, line 34-40) and these steps produce particles onto the wafer (claimed substrate with at least one chemical-containing contaminant or defects) (col. 1, line 50-55); subjecting the substrate to etching process (col. 1, line 35) (the top layer would have to be subjected to etching and be removed); detecting for the present of chemical-containing contaminant or defects using energy dispersive x-ray spectroscopy while the substrate are in the tools of processing the substrate (col. 1, line 55-col. 2, line 5). Unlike claimed invention, Steffan doesn't describe detecting the defects during the plasma etching process. Lee describes a same method of detecting the particles or defects on the substrate during the plasma etching process (col. 1, line 4-6; col. 2, line 43-45; col. 3, line 1-5). It would have been obvious for one skill in the art to modify Steffan in light of Lee because Lee teaches that in-situ particle monitoring would ensure good quality of the semiconductor device fabricated in the plasma etch chamber (col. 3, line 10-

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13). Lee further describes monitoring the number density of particles that may be formed and accumulate in the plasma etching chamber during the fabrication of the devices (col. 1, line 9-10). This would suggest determining whether the defects exceed a threshold limit.

Referring to claims 8 and 18, even though applied prior art above doesn't describe suspending the fabrication process when the defects exceed a threshold limit; however, both Steffan (col. 1, line 54-59) and Lee (col. 3, line 10-13) teach monitoring the defects to ensure good quality of substrate being fabricated, therefore, it would be obvious to one skill in the art to suspend the fabrication process when there are too many defects or contamination on the substrate in order to ensure to form a good quality substrate.

Referring to claims 3 and 4, the substrate must be enclosed in a plasma etch chamber during the etching process and it must include a defect detector system in order to detect the contaminations on the wafer.

Referring to claims 2 and 19, the contamination to be detected would be depended on the material being etched and it includes metal, or fluorocarbon polymer flakes as shown here by Lee (col. 3, line 55-60).

3. Claims 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steffan and Lee as applied to claims 5 and 18 above, and further in view of admitted prior art.

Unlike claimed invention, applied prior art above doesn't describe the energy dispersive x-ray detector system indicates the presence of contamination at about 1-2 um from the top layer surface. However, as described in page 2 of the specification that it is known to one skill in the art that defect detection and defect control are more important at deep sub-micron levels. Therefore, it would have been obvious for one skill in the art to detect the contamination at such

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deep sub-micron levels so that these contaminations would not be destructive to wafer structure and performance as suggested in page 2 of the specification.

4. Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steffan, Lee as applied to claims 5 and 18 above, and further in view of Sugimoto et al. (US 6,320,401) and admitted prior art.

Unlike claimed invention, applied prior art above doesn't describe using Auger electron Spectroscopy system to detect the contaminants. However, using Auger electron spectroscopy system, or AES, to detect the contaminants is well known to one skill in the art at the time of the invention as shown here by Sugimoto (col. 1, line 20-35). It would have been obvious for one skill in the art to use other spectroscopy system such as an AES system in order to detect contamination on the substrate with a reasonable expectation of success.

Unlike claimed invention, applied prior art above doesn't describe detecting the presence of contamination at about 1-2 um from the top layer surface. However, as described in page 2 of the specification that it is known to one skill in the art that defect detection and defect control are more important at deep sub-micron levels. Therefore, it would have been obvious for one skill in the art to detect the contamination at such deep sub-micron levels so that these contaminations would not be destructive to wafer structure and performance as suggested in page 2 of the specification.

Claim Objections

5. Claims 5-8, 20, 21 are objected to because of the following informalities: the preamble of these claims is objected because it's written as an apparatus claim, "the system of claim..."

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while their independent claims are method claims. The preamble of these claims should be written as "the method of claim..." Appropriate correction is required.

Election/Restrictions

6. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-8, 18-21, drawn to a method, classified in class 438, subclass 689.
- II. Claims 9-17, drawn to an apparatus, classified in class 250, subclass 306.

The inventions are distinct, each from the other because of the following reasons:

7. Inventions in group I and group II are related as process and apparatus for its practice.

The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice another and materially different process such as to detect defects during a deposition process.

8. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

9. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

10. During a telephone conversation with Gregory Turocy on 7/9/03 a provisional election was made with traverse to prosecute the invention of method, claims 1-8, 18-21. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-17 withdrawn

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from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

11. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
9/15/03

NADINE G. NORTON
PRIMARY EXAMINER

